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MJE204		MJE3055	3-904
MJE205		MJE3055	3-904
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MJE2091		TIP125	3-1098
MJE2092		TIP126	3-1098
MJE2093		TIP126	3-1098
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MJE2360T	MJE2360T		3-900
MJE2361		MJE2361T	3-900
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MJE2371		TIP32A	3-1073
MJE240	MJE240		3-870
MJE241	MJE241		3-870
MJE242	MJE243		3-870
MJE243	MJE243		3-870
MJE244	MJE244		3-870
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MJE2801T	MJE2801T		3-902
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MJE2901	MJE2901		3-902
MJE2901K		MJE2955T	3-904
MJE2901T		MJE2955T	3-904
MJE2955	MJE2955		3-904
MJE2955K		MJE2955T	3-904
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MJE3301		2N6038	3-135
MJE3302		2N6039	3-135
MJE3310		2N6034	3-135
MJE3311		2N6035	3-135
MJE3312		2N6036	3-135
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MJE3371		2N5193	3-89
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MJE33B		TIP41B	3-1083
MJE33C		TIP41C	3-1083
MJE34		TIP42	3-1083
MJE340	MJE340		3-876
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MJE341	MJE341		3-878
MJE341K		TIP47	3-1087
MJE3439	MJE3439		3-908
MJE344	MJE344		3-878
MJE3440	MJE3440		3-908
MJE344K		TIP47	3-1087
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MJE350	MJE350		3-880
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MJE3521		2N5190	3-85
MJE370	MJE370		3-882
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MJE371	MJE371		3-884
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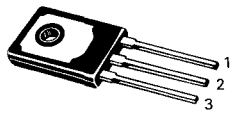
*Consult Motorola if a direct replacement is necessary.

TABLE 8 — PLASTIC TO-225 Type (Formerly TO-127 Type)†

STYLE 2:
PIN 1. EMITTER
2. COLLECTOR
3. BASE



CASE 90-05 (TO-225AB)

I_CCont Amps Max	$V_{CEO(sus)}$ Volts Min	Device Type NPN	Device Type PNP	h_{FE} Min/Max	@ I_C Amp	Resistive Switching t_s μs Max	Resistive Switching t_f μs Max	Resistive Switching @ I_C Amp	f_T MHz Min	P_D (Case) Watts @ 25°C
5	50		MJE105	25/100	2					65
	60	MJE1100##	MJE1090##	750 min	3A				1	70
		MJE1101##		750 min	4A				1	70
	80	MJE1102##	MJE1092##	750 min	3A				1	70
		MJE1103##	MJE1093##	750 min	4A				1	70
8	60	MJE6043##	MJE6040##	1k/20k	4	1.5 typ	1.5 typ	4	4#	75
	80	MJE6044##	MJE6041##	1k/20k	4	1.5 typ	1.5 typ	4	4#	75
	100	MJE6045##		1k/20k	4	1.5 typ	1.5 typ	4	4#	75
10	60	MJE2801	MJE2901	25/100	3					90
		MJE3055	MJE2955	20/70	4				2	90
12	40	2N5989		20/120	6	0.5 typ	0.25 typ	6	2	100
	80	2N5991		20/120	6	0.5 typ	0.25 typ	6	2	100
15	40	MJE1660		20/100	5				3	90
	60	MJE1661		20/100	5				3	90

$|h_{fe}|$ @ 1 MHz, ## Darlington
† Not recommended for new designs (check TO-220, Table 5 for alternates)

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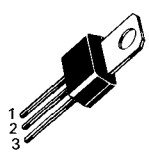
TABLE 9 — PLASTIC CASE 152†

STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR
(COLLECTOR CONNECTED TO TAB)



I_CCont Amps Max	$V_{CEO(sus)}$ Volts Min	Device Type NPN	Device Type PNP	h_{FE} Min/Max	@ I_C Amp	Resistive Switching t_s μs Max	Resistive Switching t_f μs Max	Resistive Switching @ I_C Amp	f_T MHz Min	P_D (Case) Watts @ 25°C
0.5	300	MPS-U10	MPS-U60	30 min	0.03				60	10
0.8	40	MPS-U02	MPS-U52	30 min	0.5				150	10
1	120	MPS-U03		40 min	0.01				100	10
	180	MPS-U04		40 min	0.01				100	10
2	30	MPS-U01	MPS-U51	50 min	1				50	10
	40	MPS-U01A	MPS-U51A	50 min	1				50	10
		MPS-U45##	MPS-U95##	4k min	1				100	10

Darlington
(continued)
† Not recommended for new designs (check TO-225, Table 7 or TO-220, Table 5 for alternates)

MOTOROLA
SEMICONDUCTOR
TECHNICAL DATA

NPN
MJE2801, MJE2801T
PNP
MJE2901

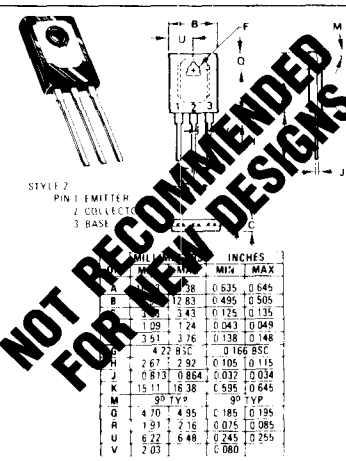
COMPLEMENTARY SILICON PLASTIC POWER TRANSISTORS

. . . for use as an output device in complementary audio amplifiers up to 35-Watts music power per channel.

- High DC Current Gain – h_{FE} = 25-100 @ I_C = 3.0 A
- Choice of Packages – MJE2801, 2901 – TO-225AB
  MJE2801T – TO-220AB

10 AMPERE
COMPLEMENTARY SILICON POWER TRANSISTORS
60 VOLTS
75, 90 WATTS

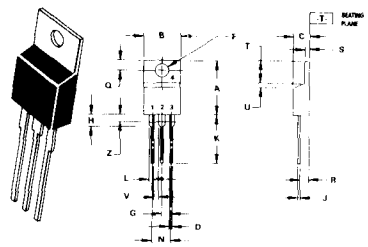
NOT RECOMMENDED FOR NEW DESIGNS



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	14.48	15.38	0.570	0.605
B	9.66	10.28	0.380	0.405
C	4.07	4.82	0.160	0.190
D	0.64	0.88	0.025	0.035
F	3.61	3.73	0.142	0.147
G	2.42	2.66	0.095	0.105
H	2.80	3.93	0.110	0.155
J	0.46	0.71	0.018	0.028
K	12.70	14.23	0.500	0.562
L	3.15	1.39	0.045	0.055
N	4.83	5.33	0.190	0.210
Q	2.54	3.04	0.100	0.120
R	2.04	2.79	0.080	0.110
S	1.15	1.39	0.045	0.055
T	5.97	6.47	0.235	0.255
U	0.00	1.27	0.000	0.050
V	1.15	—	0.045	—
Z	—	2.04	—	0.080

MJE2801
MJE2901

CASE 90-05
TO-225AB TYPE
(TO-126 TYPE)



CASE 221A-04
TO-220AB

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	60	Vdc
Collector-Base Voltage	V_{CB}	60	Vdc
Emitter-Base Voltage	V_{EB}	4.0	Vdc
Collector Current	I_C	10	Adc
Base Current	I_B	5.0	Adc
Total Power Dissipation @ T_C = 25°C MJE2801, 2901 MJE2801T Derate above 25°C MJE2801, 2901 MJE2801T	P_D†	 90 75 0.72 0.6	Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case MJE2801, 2901 MJE2801T	θ_{JC}	 1.39 1.67	°C/W

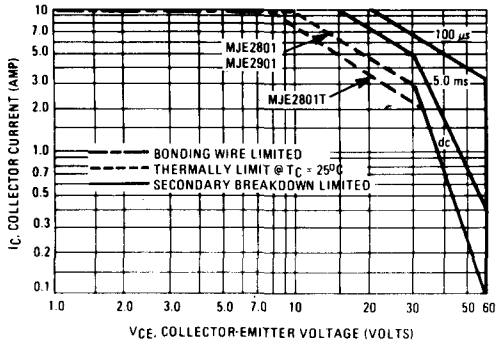
†Safe Area Curves are indicated by Figure 1. Both limits are applicable and must be observed.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (1) (I_C = 200 mAdc, I_B = 0)	$V_{(BR)CEO}$	60		Vdc
Collector-Cutoff Current (V_{CB} = 60 Vdc, I_E = 0) (V_{CB} = 60 Vdc, I_E = 0, T_C = 150°C)	I_{CBO}	 – –	 0.1 2.0	mAdc
Emitter Cutoff Current (V_{BE} = 4.0 Vdc, I_C = 0)	I_{EBO}	–	1.0	mAdc
ON CHARACTERISTICS				
DC Current Gain (I_C = 3.0 Adc, V_{CE} = 2.0 Vdc)	h_{FE}	25	100	
Base-Emitter Voltage (I_C = 3.0 Adc, V_{CE} = 2.0 Vdc)	V_{BE}	–	1.4	Vdc

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

FIGURE 1 – ACTIVE REGION SAFE OPERATING AREA



There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate $I_C - V_{CE}$ limits of the transistor that must be observed for reliable operation; i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 1 is based on $T_{J(pk)} = 150^oC$; T_C is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} \leqslant 150^oC$. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

FIGURE 2 – DC CURRENT GAIN

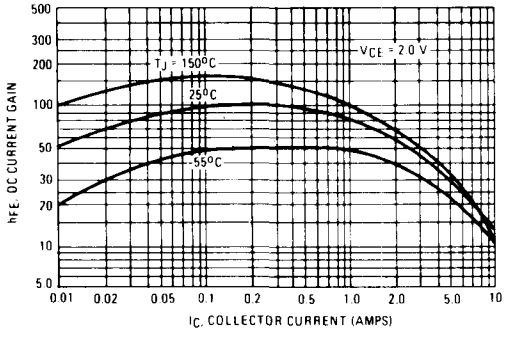


FIGURE 3 – POWER DERATING

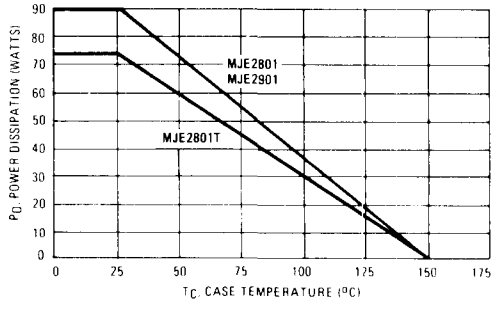
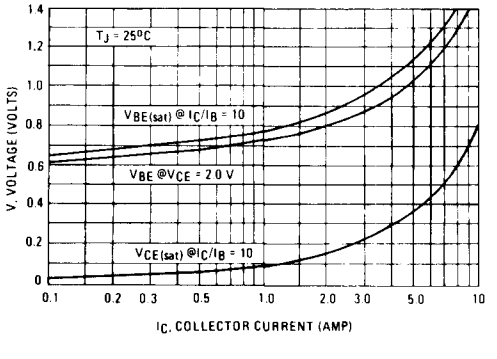
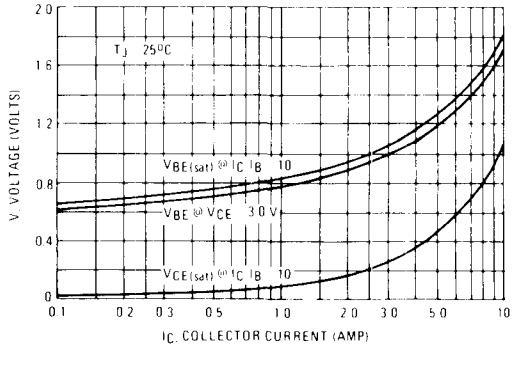


FIGURE 4 – "ON" VOLTAGES

MJE2801/MJE2801T



MJE2901



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